1'5 per cent, and above then receives small cracks and thus admits of easily being broken in pieces. With lower carbon content, the test ingot remains whole; it is then laid on a hollow support and broken by means of blows from a hammer. The harder the metal, the more easily fracture results; the softer it is, 'the more blows are necessary, and the greater bending the test ingot endures.

This test in a few minutes furnishes evidence whether enough carbon is present in order to set up a boil of sufficient intensity after increasing the oxygen content of the slag. With correctly tempered metal, however, it admits of one perceiving whether decarburisation has been sufficiently far advanced for tapping out ingot iron.

This test also indicates whether the phosphorus content is higher than permissible. The texture of the fracture of such a test must be compact and fine-grained, and exhibit a definite, not too glaring, metallic lustre. Phosphorus, however, makes the texture coarsely granular or coarsely striated, and gives it a powerful lustre. These phenomena stand out more markedly the higher the phosphorus content.

With these indications, the capacity of the test is exhausted, and all the remaining properties of the metal do not admit of being perceived thereby.

The results are considerably more extensive if the metal to be investigated is first forged and then further tested. Here again a small test ingot is cast, preferably of rectangular section, and brought at a red heat under a small steam hammer and forged out. With a carbon content of about 1'5 per cent, this usually is not possible—the ingot falls in pieces. With lower carbon content, however, it admits of being drawn out into a bar, to which in practice always the same section is given : viz., about 14 square millimetres. A piece of about 400 millimetres length is cut off from this and placed on one side and allowed to cool down slowly.

The remainder, still bright red, is brought up by heating to the necessary temperature and quenched in cold water. Metal with more than 0"55 per cent, to 0"60 per cent. C develops hardening cracks, or splits up into several pieces if the carbon is very high, whilst metal with low carbon content remains